The Relationship Between Household Consumption and Income

In this section, we assess whether the relationships between income and consumption for farm and all U.S. households are consistent with the prediction that households exposed to greater income variability will smooth consumption from current income more than households with more stable income over time. The first test is to compare the patterns of average equivalent-consumption to average equivalent-income across equivalent-income categories. We first compare the patterns for all U.S. versus all farm households. To assess the reasonableness of the ARMS results, we compare the patterns in consumption shares (food, health, etc.) by type across the income categories. Subsequently, to avoid the noise introduced into the comparison as a result of using two different surveys with different elicitation approaches for expenditures, we conduct in-survey comparisons within CE and ARMS.

The second test will compare the consistency of individual household rankings (by quintile in the distributions) for consumption and for income, among farm households versus all U.S. households.

Propensity To Consume From Current Income: Farm Versus All U.S. Households

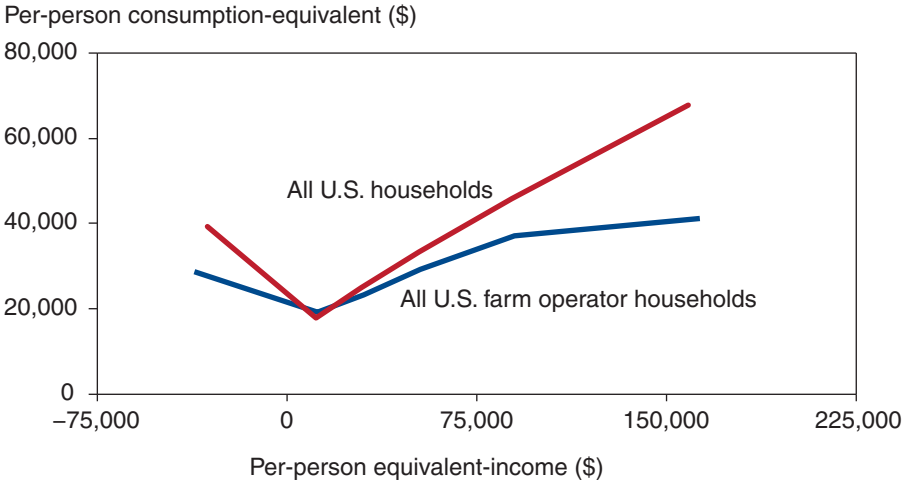
ARMS Farm Households and CE All U.S. Households

We first explore the hypothesis that farm households budget or moderate consumption to a greater extent than all U.S households, analyzing data from the best sources for each population—ARMS for farm households, and CE for all U.S. households. To do this, we split households in each population into six equivalent-income categories. Figure 3 illustrates the value of mean equivalent-consumption associated with mean equivalent-income for each population. Table 5 reports the values, along with additional economic data to provide insight into the extent of income risk-bearing and wealth (to support spending) within the category.

The lowest equivalent-income category is for households with negative household income—where self-employment losses exceed other sources of income. (By separating this group out, the interpretation of shares of income from wages or self-employment income is much cleaner.) The income shocks typically needed to generate negative household income are likely transitory, so we expect that permanent income may be substantially higher for households with negative current income. For example, nearly 6 percent of farm households had negative income in 2006 (compared to 0.2 percent for all U.S. households), but their average household net worth of $1.3 million is comparable to farm households with equivalent-income of $70,000-$124,999 (table 5). The average share that self-employment provides of total household income is negative in the second income category ($1-$19,999) for farm households, but increases to over 50 percent in the top two income groupings ($125,000-$224,999 and $225,000 and above).

Figure 3

Average propensity to consume, by equivalent-income class, of farm operator (ARMS) and all U.S. households (CE), 2006



Note: For the two population groups, each point represents the mean equivalent-income, equivalent-consumption pair for the following equivalent-income categories: (<$0, $1-19,999, $20,000-$39,999, $40,000-$69,999, $70,000-124,999, and $125,000-224,999). See table 5 for data.

Source: USDA, Economic Research Service using Agricultural Resource Management Survey, 2006, for farm households and using Consumer Expenditure Survey, 2006, for all U.S. households.

As expected, the ratio of consumption to income decreases as income increases for both farm households and all U.S. households. Also as expected, the flatter consumption-income relationship for farm households illustrates their lower propensity to increase consumption with higher income in a given year, in order to accommodate greater income variability from year to year.

Our expectation is that, when income is unexpectedly low, farm households will be less inclined to cut back essentials such as food compared to similar households with more stable income, and when income is unexpectedly high, they will be less inclined to expand discretionary purchases. To assess whether we observe such behavior, we also report—for each equivalent-income category—the consumption shares for the five consumption components. We expect food shares will decline and "all else" shares will increase with income, except for the group with negative household income—we anticipate this group has positive and substantially higher permanent income, and so will display patterns comparable to a higher equivalent-income category.

The trends across income levels in consumption shares by type are comparable in the two populations: consumption shares for food, housing, health care—and for farm households, home consumption—basically decrease as income grows; shares for transportation increase until the upper tail of the distribution, where they decrease; and shares of "all else" increase across income levels. Households with negative household income are an exception to the pattern. For the most part, shares of "all else" consumption are lower for farm households; however, the rates of increase in the shares are the same for farm and all U.S. households. From the lowest (positive) to the highest income category,

Table 5

Average propensity to consume by income-equivalent categories, farm operator households and all U.S. households, 2006 (2005-2007)

Category	*<$0*	*$1-19,999*	*$20,000 - $39,999*	*$40,000 - $69,999*	*$70,000 - $124,999*	*$125,000 - $224,999*	*$225,000+*	*All*
Farm operator households, 2006 (ARMS)								
Percent of farm households	5.7	21.1	29.9	26.2	12.1	3.1	1.8	100.0
Cumulative percent of farm households	5.7	26.9	56.8	83.0	95.1	98.2	100.0	
Wage/salary income share	-18%	63%	66%	61%	53%	36%	17%	54%
Self-employment income share	127%	-17%	2%	15%	31%	49%	70%	23%
Household net worth—mean ($)	1,301,351	676,170	710,745	949,645	1,287,517	1,978,061	3,291,686	955,708
Est. market value of home (household or farm owned) ($)	151,561	109,859	126,395	155,384	184,343	232,155	325,531	145,697
Equivalent-income—mean ($)	-36,892	12,266	30,469	52,389	90,072	163,418	476,074	48,019
Equivalent-consumption—mean ($)	28,869	19,257	23,228	29,154	37,220	41,235	57,482	27,141
Equiv-C (mean)/Equiv-Y(mean)	-0.78	1.57	0.76	0.56	0.41	0.25	0.12	0.57
Equivalent-consumption shares:								
Food	17%	19%	17%	16%	15%	14%	11%	16%
Housing	38%	39%	37%	37%	36%	36%	33%	37%
Transport	12%	14%	16%	18%	19%	14%	17%	16%
Health care	15%	13%	13%	11%	10%	14%	11%	12%
All else	17%	14%	17%	18%	19%	22%	28%	18%
Home consumption of farm produce	0.8%	0.7%	0.5%	0.3%	0.2%	0.2%	0.2%	0.4%
All U.S. households, 2006 (CE)								
Percent of U.S. households	0.2	32.0	31.5	23.4	10.1	2.3	0.5	100.0
Cumulative percent of U.S. households	0.2	32.2	63.7	87.1	97.1	99.5	100.0	
Wage/salary income share	-56%	57%	78%	85%	85%	79%	66%	79%
Self-employment income share	152%	1%	3%	5%	7%	11%	23%	6%
Est. market value of owned home ($)	396,374	77,605	144,668	230,244	407,460	555,752	805,280	183,212
Equivalent-income—mean ($)	-31,548	11,458	29,336	51,981	88,888	158,556	352,918	39,558
Equivalent-consumption—mean ($)	39,254	17,815	24,981	33,297	45,909	67,759	95,292	28,137
Equiv-C (mean)/Equiv-Y(mean)	-1.24	1.55	0.85	0.64	0.52	0.43	0.27	0.71
Equivalent-consumption shares:								
Food	13%	16%	15%	14%	12%	11%	9%	14%
Housing	40%	46%	43%	41%	40%	37%	38%	42%
Transport	19%	15%	19%	20%	18%	16%	14%	18%
Health care	5%	7%	7%	6%	5%	5%	5%	6%
All else	24%	16%	17%	20%	24%	32%	33%	20%
Farm operator households, 2005-2007 (CE)								
Percent of farm households	na	10.6	29.7	36.1	16.1	4.2	na	100.0
Cumulative percent of farm households	na	12.1	41.9	78.0	94.1	98.4	na	
Wage/salary income share	na	71%	66%	62%	66%	49%	na	56%
Self-employment income share	na	7%	17%	23%	14%	29%	na	19%
Est. market value of owned home ($)	na	179,087	268,459	253,253	428,231	564,791	na	303,066
Equivalent-income—mean ($)	na	12,398	29,857	51,795	91,752	159,271	na	54,523
Equivalent-consumption—mean ($)	na	20,993	24,336	29,296	43,649	55,733	na	31,469
Equiv-C (mean)/Equiv-Y(mean)	na	1.69	0.82	0.57	0.48	0.35	na	0.58
Equivalent-consumption shares:								
Food	na	15%	14%	14%	14%	10%	na	15%
Housing	na	35%	35%	37%	33%	34%	na	42%
Transport	na	21%	20%	21%	19%	17%	na	18%
Health care	na	9%	11%	10%	9%	7%	na	6%
All else	na	19%	20%	19%	26%	32%	na	20%

Sources: USDA, Economic Research Service using Agricultural Resource Management Survey and Consumer Expenditure Survey.

"all else" shares double from 14 percent to 28 percent for farm households and from 16 percent to 33 percent for all U.S. households (table 5).

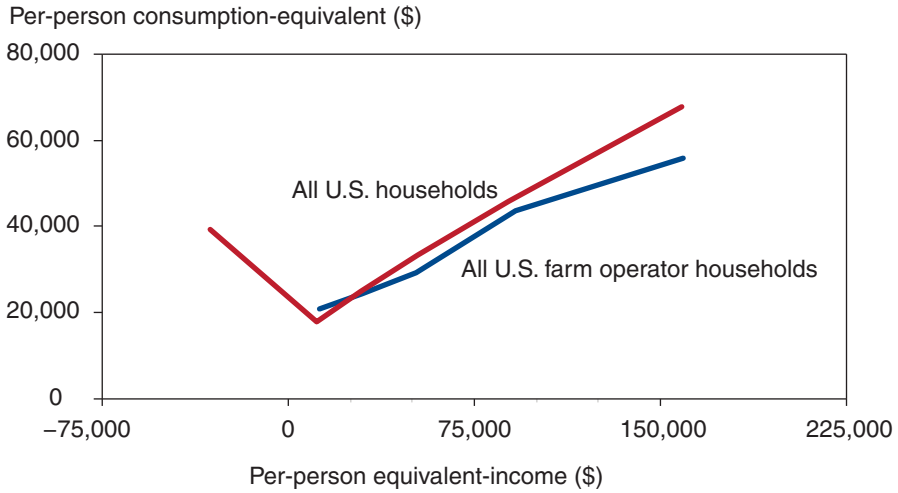
CE Farm Households and CE All U.S. Households

Farm households retain a flatter consumption-income relationship (than all U.S. households) when measured with CE data (fig. 4), though the line is not as flat as with ARMS data (fig. 3). This pattern is consistent with expectations, given that, in the two highest income categories, the self-employment income shares for CE farm households are about half that of ARMS farm households (14 and 29 percent for CE farm households versus 31 and 49 percent for ARMS farm households). Less dependent on self-employment income, CE farm households are more likely to have more stable income.

Consumption shares for farm households relative to all U.S. households in the CE data are consistent with ARMS for some commodities (housing is again lower and medical care higher for CE-farm households than for CE-all U.S. households), but diverge for others (the food share is lower and the "all else" share is higher for CE-farm households). Also, the patterns in CE farm consumption shares appear more random, attributable in part to the small sample sizes for individual income categories. Still, as elsewhere, food shares tend to decline with income and "all else" shares tend to increase.

Given the small sample sizes and presumed differences in risk exposure between cohorts, it seems unwarranted to interpret the differences between the CE and ARMS farm households as indicating understatement of con-

Figure 4
Average propensity to consume, by equivalent-income class, of farm operator households (CE) and all U.S. households (CE), 2005-2007



Note: For the two population groups, each point represents the mean equivalent-income, equivalent-consumption pair for the following equivalent-income categories:(<$0, $1-19,999, $20,000-$39,999, $40,000-69,999, $70,000-124,999, and $125,000-224,999). Sample size is insufficient to report the <$0 category for U.S. farm households. See table 5 for data.

Source: USDA, Economic Research Service using Consumer Expenditure Survey, 2006 for all U.S. households and 2005-2007 for all U.S. farm households.

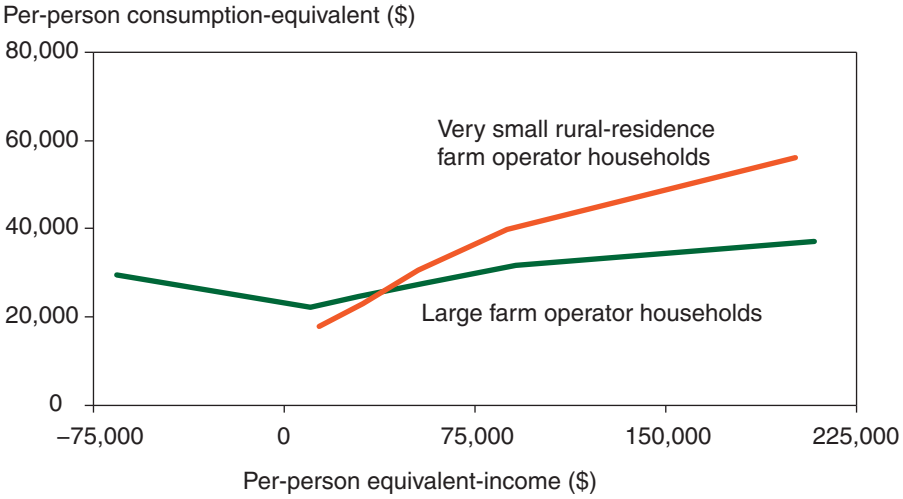
sumption levels at the upper end of the income distribution. At the same time, we are unable to rule out such measurement error.

Propensity To Consume From Current Income: Households of Farms with Sales of $100,000+ Versus Households of Very Small Rural-Residence Farms

We exploit the diversity of the farm sector by comparing two farm household subgroups in ARMS—one that is not much exposed to the risks of self-employment income variability (very small rural-residence farms) and one that is (farms with annual sales of $100,000 or more). For households of large farms, equivalent-income is higher on average, but is also more dispersed: it is more likely to be negative and is more likely to be above $225,000 (table 6). As expected, households operating these large farms have a lower propensity to consume from current income than households operating very small rural-residence farms (fig. 5).

We again report shares for the five components of consumption. Perhaps due to the smaller sample size, the patterns are less clear than with all farm households. The strongest trends are consistent with our predictions: the food share declines with income and the "all else" share increases with income (with one income category out of the pattern for each household type).

Figure 5
Average propensity to consume, by equivalent-income class, by households of large farm operators and of very small farm operators (ARMS), 2006



Note: For the two population groups, each point represents the mean equivalent-income, equivalent consumption pair for the following equivalent-income categories: (< $0, $1-$19,999, $20,000-$39,999, $40,000-$69,999, $70,000-$124,999, $125,000-$224,999). There is insufficient sample size to report the < $0 and $225,000 + categories for very small rural-residence farm households. See table 6 for data.

Definitions: **Large farms**: farms with sales of $100,000 or more. **Very small rural-residence farms:** farms where the principal operator indicates his primary occupation is other than farming, and whose farm has sales of $10,000 or less this year.

Source: USDA, Economic Research Service using Agricultural Resource Management Survey, 2006.

Table 6

Average propensity to consume of households of farm operators of $100,000+ sales versus very small rural-residence farms, by equivalent-income groups, 2006

Both income and consumption measures are reported in equivalent form.

Income-equivalent classes:	*<$0*	*$1-19,999*	*$20,000 - $39,999*	*$40,000 - $69,999*	*$70,000 - $124,999*	*$125,000 - $224,999*	*$225,000+*	*All*
Farms with sales of $100,000 or more:								
Percent of households	13.7	14.0	21.1	21.5	16.7	9.8	3.3	100.0
Cumulative percent of households	13.7	27.7	48.8	70.3	87.0	96.7	100.0	
Wage/salary income share	-14%	76%	41%	32%	19%	11%	3%	22%
Self-employment income share	119%	-8%	44%	58%	70%	82%	91%	67%
Household net worth—mean ($)	1,648,679	1,352,141	1,116,385	1,370,141	1,868,172	2,709,479	3,528,134	1,636,325
Est. market value of home (household or farm owned ($)	152,443	132,302	130,615	146,003	164,529	227,143	235,344	155,155
Equivalent-income—mean ($)	-65,996	10,443	29,308	55,068	91,296	208,431	682,774	68,229
Equivalent-consumption—mean ($)	29,477	22,359	24,673	27,646	31,776	37,256	39,465	28,540
Equiv-C (mean)/Equiv-Y(mean)	-0.45	2.14	0.84	0.50	0.35	0.18	0.06	0.42
Equivalent-consumption shares:								
Food	17%	17%	16%	20%	16%	15%	13%	17%
Housing	34%	36%	35%	34%	35%	38%	37%	35%
Transport	14%	11%	15%	14%	15%	13%	14%	14%
Health care	14%	16%	14%	14%	11%	13%	10%	14%
All else	19%	18%	19%	17%	22%	20%	25%	20%
Home consumption of farm produce	1%	2%	1%	1%	1%	0%	0%	1%
Very small rural-residence farms:								
Percent of households	na	14.7	33.4	32.0	15.3	3.1	na	100.0
Cumulative percent of households	na	14.7	48.1	80.1	95.4	98.5	na	
Wage/salary income share	na	100%	99%	85%	76%	66%	na	82%
Self-employment income share	na	-8%	-9%	6%	16%	26%	na	8%
Household net worth--mean ($)	na	464,763	447,771	662,464	991,548	1,832,898	na	659,501
Est. market value of home (household or farm owned) ($)	na	111,941	123,505	148,897	201,209	267,634	na	151,791
Equivalent-income—mean ($)	na	13,950	30,751	52,683	87,515	200,748	na	51,331
Equivalent-consumption—mean ($)	na	17,860	23,165	30,624	39,860	56,129	na	28,763
Equiv-C (mean)/Equiv-Y(mean)	na	1.28	0.75	0.58	0.46	0.28	na	0.56
Equivalent-consumption shares:								
Food	na	22%	19%	16%	15%	15%	na	17%
Housing	na	39%	35%	36%	37%	28%	na	36%
Transport	na	14%	17%	19%	23%	20%	na	19%
Health care	na	9%	10%	10%	9%	7%	na	10%
All else	na	16%	18%	19%	16%	31%	na	18%
Home consumption of farm produce	na	0%	0%	0%	0%	0%	na	0%

Notes: To take account of differences in household size and economies of scale in standard of living, we adjust total household income and total household consumption by an equivalence scale (the square root of household size).
Definitions: **Large farms**: farms with sales of $100,000 or more. **Very small rural-residence farms**: farms where the principal operator indicates his primary occupation is other than farming, and whose farm has sales of $10,000 or less this year.
Median per-person equivalent-income is $40,493 for very small rural residence farms, and $42,103 for $100,000+ sales farms in this sample.
na = insufficient sample to report.

Source: USDA, Economic Research Service using ARMS analysis sample, 2006.

Consistency in Household Ranks in Income and Consumption Distributions

The lack of a close mapping between current income and consumption measures for farm households compared to all U.S. households can be attributed to the greater discrepancy they experience between permanent income and current income. As such, current income is a weaker proxy for current standard of living for farm (and other self-employed households) than for all U.S. households.

The two-way distributions in table 7 were inspired by the earlier work of Rogers and Gray (1994), who compared quintiles of income to quintiles of outlays for all U.S. households using 1992 CE data. If current income were a good predictor of consumption, we would expect households to be concentrated along the diagonals, where the household quintile ranking in the consumption distribution matches its ranking in the income distribution; alternatively, if the two were uncorrelated, a random distribution would suggest 20 percent in each cell in the income row.

Equivalent-income and equivalent-consumption quintiles: For U.S. households, the diagonal cells have the largest share of households along each row in the income-consumption table. The effect is strongest for the first and fifth quintiles: notably, 58 percent of households in the lowest income quintile are in the lowest consumption quintile, and 56 percent of households in the highest income quintile are in the highest consumption quintile. The other diagonal cells have about one-third of their row totals.

Table 7

Two-way distributions of household well-being measures by quintiles, 2006

Farm operator households					
Equivalent income quintiles	Equivalent-consumption quintiles				
	20	**40**	**60**	**80**	**100**
20	38	23	12	14	13
40	28	22	27	13	10
60	18	26	22	23	10
80	7	17	25	23	28
100	8	11	15	27	38

All U.S. households					
Equivalent income quintiles	Equivalent-consumption quintiles				
	20	**40**	**60**	**80**	**100**
20	58	21	10	7	5
40	27	32	22	12	7
60	11	29	29	20	11
80	3	15	28	33	21
100	1	3	11	28	56

Income quintiles	Household net worth quintiles				
	20	**40**	**60**	**80**	**100**
20	25	22	18	20	15
40	28	23	23	12	14
60	19	25	22	21	13
80	19	17	23	21	20
100	10	13	14	25	38

Notes: Each row and each column sums to 100 percent (except due to rounding error).

Sources: USDA, Economic Research Services using Consumer Expenditure Survey, 2006, and Agricultural Resource Management Survey, 2006 analysis sample.

Farm households are more likely to be off-diagonal. For example, among farm households, those in the lowest income quintile are much more likely to be in one of the three highest consumption quintiles than is evident for all U.S. households (39 percent of farm versus 22 percent of all U.S. households). Analogously, farm households in the highest income quintile are much more likely to be in the three lowest consumption quintiles (34 percent of farm versus 15 percent of all U.S. households).

Income-wealth quintiles: The final two-way comparison in table 7 is income versus net worth quintiles for farm households. The divergence in ranking between income and wealth is particularly strong for those in the first income-quintile (53 percent of which are in the top three wealth quintiles). This is consistent with households that operate commercial farms with an extensive asset base experiencing large income dips in a given year.

In sum, the extensive divergence in quintile ranking between income and consumption indicates that current farm household income is more variable than the long-term, or permanent, household income that drives consumption. Since wealth provides a source of assets to draw down or to borrow against during temporary income shortfalls, the even stronger pattern of divergence between income and wealth quintiles for farm households further supports this inference.